Re: Which test to use?

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On Sat, 7 Mar 2009 15:13:27 −0800 (PST), David Winsemius
<dwinsemius@xxxxxxxxxxx> wrote:

> On Mar 7, 12:42 pm, speedy <frank.degee...@xxxxxxxxx> wrote:
>
> > Hi,
> >
> > In a research project, 50 rats were made diabetic and compared with 50
> > (nonmatched) control rats. Each rat had a measurement in each of 6
> > regions in the myocardium (heart). I would like to compare the
> > measurements in each of the 6 regions between the diabetic and control
> > groups. Of course I could do that by 6 t−tests (one for each region).
> > My question, however, is: could there be a test that allows me to do
> > an overall comparison between the diabetic and control groups, for all
> > regions combined? Something akin to ANOVA?
>
> You already have sensible replies. One further and arguably less
> complex approach would be to sum the 6 measurements (histologic?
> electrophysiologic?) over each subject (a "glycemic morbidity score")
> and do a t−test on the sum.

Okay, in summary.

You can do 6 t−tests, and that will be simple to look at.
It will also allow an "overall test" by using Bonferroni
correction on assessing the p−value. This will be good,
and it will be powerful, if the underlying difference between
groups is apt to exist in only *one* of the measures, and
you have no idea which one (which, actually, may be unlikely).

A overall test with 1 degree of freedom will be the most powerful
test that can be done, if you can identify one "dimension"
beforehand that is apt to carry the difference between
groups. The simple, ad−hoc approach to a single dimension
exists if there is a good−bad direction to each of the measures.

− Take the total, as DW suggests, if they are all scaled the same. This is the same test, by the way, as what you can achieve by setting up the variables are Repeated Measures.
− Take a composite that equally weights the variables when they have grossly different variances.
− Or, look at intercorrelations, first; drop any variable or two that does not correlate well enough with the others, if you have doubts about some of the measures.

If you expect an odd pattern of differences or if the variables have high correlations, then a multivariate test is in order. That would be Hotelling's T or two−group discriminant function, to stay within ANOVA. Another two group test for patterns of difference would be Logistic Regression.

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Rich Ulrich
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